In The Claims:

Claim 1. (currently amended) A fabrication method for a buried plate of a deep trench capacitor, comprising:

providing a substrate, wherein the substrate is already formed with a deep trench;

forming a doped layer on a surface at a bottom of the deep trench and ~~a forming~~ forming a material layer on the doped layer;

forming a passivation layer on a sidewall of the deep trench that is not covered by the material layer;

removing the material layer;

performing a thermal process to drive-in dopants in the doped layer to the substrate to form a doped region and concurrently inducing a reaction between the doped layer and the substrate to form an oxide layer; and

removing the oxide layer.

Claim 2. (original) The fabrication method of claim 1, wherein the thermal process comprises using an oxygen gas, wherein a flow rate of the oxygen gas is about 10 to 50 liter/minute.

Claim 3. (original) The fabrication method of claim 1, wherein the thermal process is conducted at a temperature of about 700 degrees to 1000 degrees Celsius.

Claim 4. (original) The fabrication method of claim 1, wherein the thermal process is conducted for about 10 to about 30 minutes.

Claim 5. (original) The fabrication method of claim 1, wherein forming the passivation layer on the sidewall of the deep trench that is not covered by the material layer further comprises:

forming a conformal passivation layer above the substrate and on the surface of the deep trench, covering the material layer and the doped layer; and

etching back the conformal passivation layer to form the passivation layer on the sidewall of the deep trench that is not covered by the material layer .

Claim 6. (original) The fabrication method of claim 5, wherein forming the conformal passivation layer comprises performing a deposition process.

Claim 7. (original) The fabrication method of claim 1, wherein the passivation layer is formed with a material that includes silicon nitride.

Claim 8. (original) The fabrication method of claim 1, wherein the passivation layer is about 150 angstroms to about 200 angstroms thick.

Claim 9. (original) The fabrication method of claim 1, wherein the substrate that is being consumed during the reaction between the doped layer and the substrate is about

150 angstroms to about 200 angstroms thick.

Claim 10. (original) The fabrication method of claim 1, wherein forming the doped layer on the surface at the bottom of the deep trench and forming the material layer on the doped layer further comprises

forming a conformal doped layer above the substrate and on the surface of the deep trench;

filling the material layer in the deep trench, wherein the material layer does not completely fill the deep trench; and

removing the conformal doped layer that is not covered by the material layer.

Claim 11. (original) The fabrication method of claim 1, wherein the material layer comprises polysilicon.

Claim 12. (original) The fabrication method of claim 1, wherein the doped layer comprises a silicate glass layer doped with arsenic ions

Claim 13. (original) A fabrication method for a buried plate of a deep trench capacitor, comprising:

providing a substrate having a deep trench already formed therein;

forming a doped layer on a bottom surface of the trench;

forming a passivation layer on a sidewall at a top of the deep trench;

performing a thermal process to drive-in dopants in the doped layer to the substrate to form a doped region and concurrently inducing a reaction between the doped layer and the substrate to form an oxide layer; and

removing the oxide layer.

Claim 14. (original) The method of claim 13, wherein the thermal process is conducted with an oxygen gas, wherein a flow rate of the oxygen gas is about 10 to 50 liter/minute.

Claim 15. (original) The method of claim 13, wherein the thermal process is conducted at about 700 degrees to 1000 degrees Celsius.

Claim 16. (original) The method of claim 13, wherein the thermal process is conducted for about 10 to 30 minutes.

Claim 17. (original) The method of claim 13, wherein the substrate that is being consumed during the reaction between the doped layer and the substrate is about 180 angstroms to about 220 angstroms thick.

Claim 18. (original) The method of claim 13, wherein the passivation layer is formed with a material that comprises silicon nitride.

Claim 19. (original) The method of claim 13, wherein the passivation layer is about 150 angstroms to about 200 angstroms thick.

Claim 20. (original) The method of claim 13, wherein the doped layer comprises a silicate glass layer doped with arsenic ions.